L250
INSTRUCTION MANUAL

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THE L250

The L250 is the most advanced loudspeaker JBL has yet built for the home, a definitive expression of JBL's quality and craftsmanship. From the singular shape of the enclosure to the design of the level controls, JBL has spared no effort, overlooked no performance factor necessary to building the most accurate loudspeaker possible.

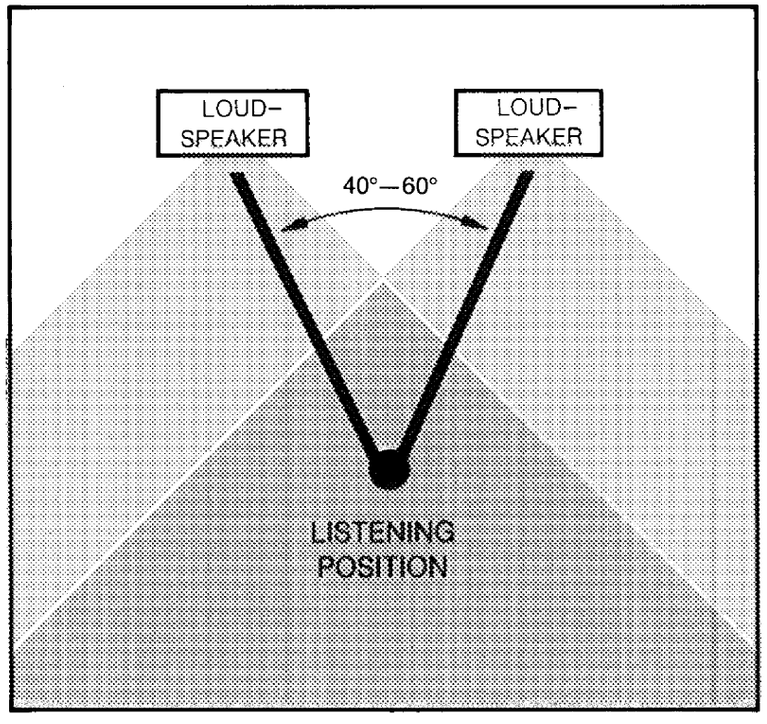
The L250 will sound as good as your equipment and program source will allow. Imaging is precise and stable. Frequency response, both on and off axis, is nearly ruler-flat across the whole audible bandwidth. Distortion is held to levels more typical of fine electronics than of loudspeakers.

The woodworking complements the engineering. Carefully crafted in hardwood veneers and matching solid pieces, each enclosure is finished by hand.

Despite its sophistication, the L250 is not difficult to set up properly. The brief instructions that follow will help you realize the full potential of the system. We have also included a technical information section that examines the design goals and the methods we used to achieve them.

PLACEMENT

Ideally, the L250s should be placed at least three feet from any walls. The two systems should be equidistant from your primary listening position; the distance should be determined by the distance between



the speakers. We recommend that the angle between the speakers, at the listening position, be 40° to 60° (see illustration). For example, if the systems are 8 feet apart, your listening position should be 8 to 12 feet from each speaker. To widen the area in which the best stereo image will be perceived, we also recommend turning the speaker to face the primary listening position.

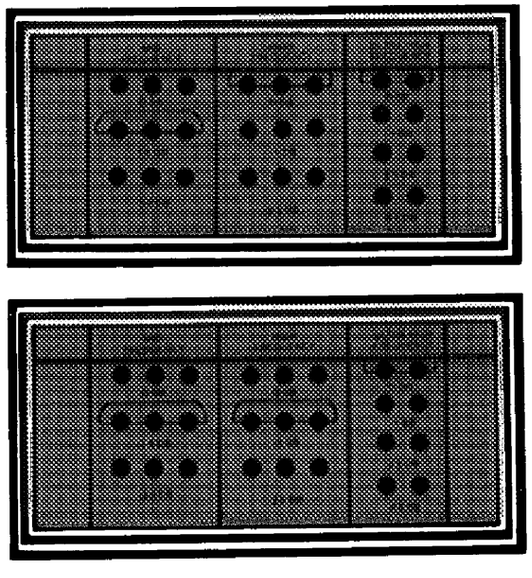
It is not important which L250 is assigned to the right channel and which to the left.

CONNECTIONS

The binding posts on the rear panel of the L250 will accept most types of audio cable and connectors, including banana plugs. They will also accept bare wire.

For each channel, connect the red terminal on the L250 to the red, "positive," or "+" terminal on your amplifier. Connect the black L250 terminal to the black, "ground," or "−" terminal of the amplifier. Connecting the systems in this manner ensures that they will operate in phase; i.e., work together rather than in opposition. Connecting the systems out of phase will not damage them but will adversely affect the sound.

The L250 has level adjustments for the lower midrange, midrange, and high frequency drivers, located on the rear panel. The controls consist of attenuators selected by connecting a bus bar across a pair of terminals. All you will need is a screwdriver. Remove the bus bar from the "O" setting, select the amount of attenuation you want, and reconnect the bar across the appropriate pair of terminals. The level adjustments are subtle and will not change the essential character of the L250's sound. Nevertheless, we recommend that level adjustments be made one step at a time and carefully evaluated.



GRILLE

A loudspeaker grille is a mixed blessing. It protects the transducers from pets and children and enhances the appearance of the system in many rooms. But even the most acoustically transparent grille affects the sound. On the L250 the effect is minor but apparent. Therefore, for serious listening, we recommend that the grille be removed. For casual listening or background music, the effect is less significant.

SERVICE

Should your L250s require service, return them to the JBL dealer from whom they were purchased. If this is impractical, write or call the JBL Service Department, describing the problem in detail. Products returned to the factory should be shipped freight prepaid to the JBL Customer Service Department, 8500 Balboa Boulevard, P.O. Box 2200, Northridge, California 91329 U.S.A. (213/893-8411)

TECHNICAL INFORMATION

The design goal of the L250 was to optimize the combination of several attributes: tonal accuracy, transient accuracy, high output capability with low distortion, and accurate, stable stereophonic imaging. The L250 combines these attributes in greater measure, with fewer compromises, than any other loudspeaker system we've built. The section that follows defines each attribute and explains how the L250 was designed to meet them.

Tonal Accuracy–Tonal accuracy refers to the smoothness of the loudspeaker's response over the entire audio range. This includes the frequency response as measured on axis, and also includes the system's response measured off axis (power response). The on-axis response indicates the sound that first reaches your ears; flat response is important because these sounds determine the naturalness of instrumental timbres and provide localization cues. Power response measures the total acoustical power radiated by the loudspeaker in all directions. Because most of the sound that reaches your ears has been reflected at least once, smooth power response is necessary for the best overall response in an actual listening environment.

Several features of the L250 contribute to its flat response both on and off axis. The L250 is a four-way system, and each transducer is only operating over that portion of its frequency range at which it exhibits flat axial frequency response and uniform power response. The frequency dividing network does minimal response shaping, and the gentle 6 dB per octave slopes at the transition frequencies further contribute

to smooth response. The baffle design is significant. Its rounded edges and tapered shape minimize diffraction effects and the associated peaks and dips in response.

Transient Accuracy–Often called "transient response," transient accuracy indicates how well a loudspeaker can reproduce a steep waveform; e.g., a rifle shot–or a plucked string. A loudspeaker with high transient accuracy will maintain the original time relationship among the frequency components of this waveform; any alteration in the time relationships, and subtle details will be lost; the musical transients will "blur."

The four transducers in the L250 have inherently excellent transient accuracy. To allow them to reach their potential, the L250 incorporates a highly sophisticated version of JBL's high resolution network design. Borrowing from electronics design practice, polypropylene and polystyrene "bypass" capacitors are wired in parallel with the network's larger capacitors. The large capacitors are necessary for high power handling, but, by themselves, they exhibit a hysteresis effect on signal waveforms; they alter the time relationship among the frequency components of the waveform. The highly linear bypass capacitors allow the waveforms to pass unaltered and do not affect the power handling capacity of the larger capacitors. Adding a second bypass capacitor gives still further improvement, and the L250 uses paired bypass capacitors (of unlike dielectric) where appropriate.

The gentle crossover slopes which help achieve the flat power response also introduce the minimum delay errors between drivers, so that transients involving more than one transducer remain unaltered. The tilted baffle corrects any timing errors introduced by driver positioning to within 200 microseconds (well below the threshold of detectability).

High Power Handling with Low Distortion–A loudspeaker's ability to produce high sound pressure levels with low distortion is especially important as the new technologies preserve actual peak relationships in recordings. A loudspeaker system may be called upon to reproduce peaks of up to 15 dB above the average power level–a power increase of 32 times. The loudspeaker must not only handle that power, but do so without dynamic compression, a phenomenon in which the transducer's output falls off as its voice coil heats up.

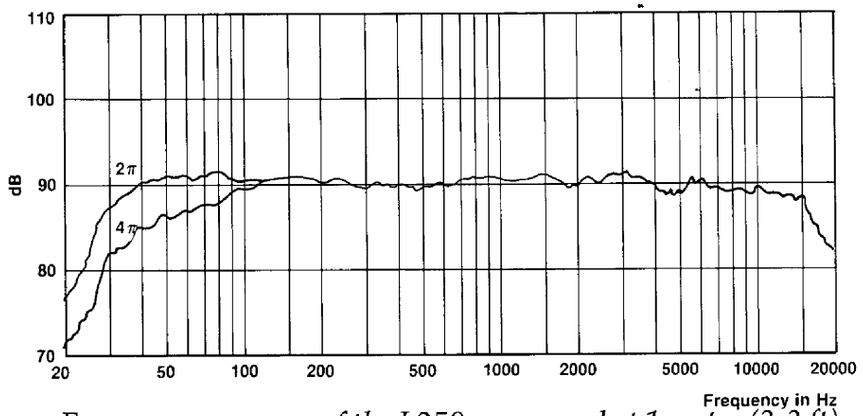
JBL loudspeakers have long been known for their power handling, and the L250 is very much in that tradition. All of the transducers of the L250 have cast frames that maintain precise voice coil and magnetic gap geometry. The SFG (Symmetrical Field Geometry) magnetic structure of the 14-inch and 8-inch drivers allows long cone excursions with minimum distortion. The dividing network too is ruggedly built: all reactive components have high current and voltage ratings and can handle any expected power input without exhibiting nonlinearities. All resistors are wire-wound, noninductive types. Level adjustments are made with fixed-value, low-loss stepped attenuators employing high-current bus bars. This attenuator system combines the sonics and power handling of hard wiring with the flexibility to optimize system output for various environmental conditions.

In addition to their high power handling, the two midrange transducers have very high sensitivity, at least twice that of the low frequency and high frequency drivers. Most musical energy lies in the mid frequencies, and this higher sensitivity gives the drivers the power reserves to handle the highest peaks. All the transducers have copper voice coils, which offer the least electrical variation as they heat up; this minimizes dynamic compression.

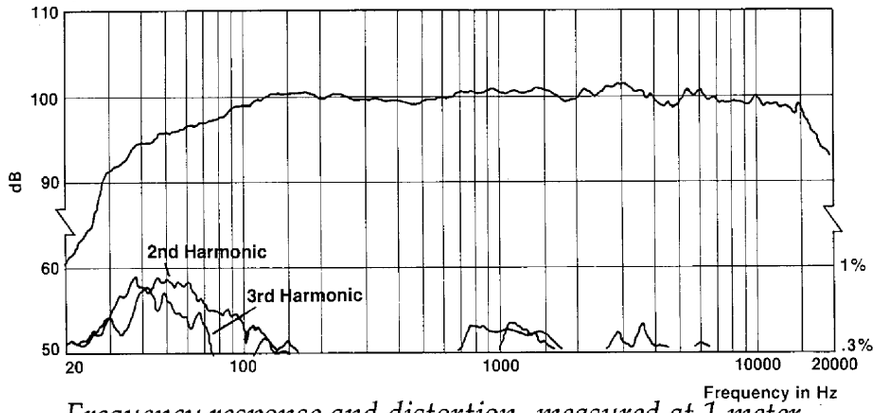
The rugged construction carries over to the enclosure. Constructed of ¾-inch (19 mm) particle board throughout, the enclosure is extensively braced and heavily damped to eliminate resonances.

Stereo Imaging–A pair of loudspeakers should produce both a lateral image and a depth image (with good recordings). Loudspeakers that do not, no matter what their other qualities, will not accurately recreate the original performance.

The L250 achieves its outstanding imaging through the careful design of the system elements and their proper placement. The L250 is designed as a mirror-imaged line array; the stereophonic imaging it will produce (with a good recording) is very accurate and very stable.

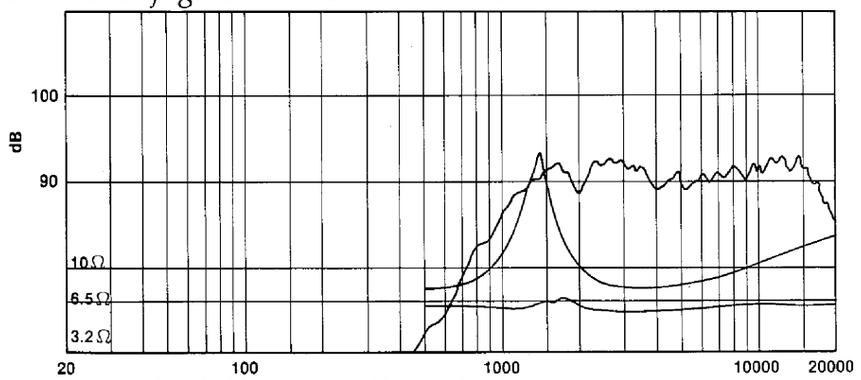


Frequency response of the L250, measured at 1 meter (3.3 ft) on axis with a 1-watt input, in free-field (4 π) and hemispherical free-field (2 π) environments.

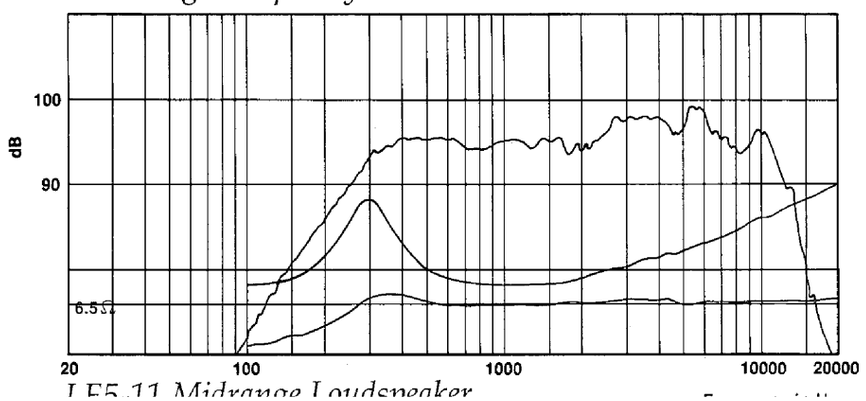


Frequency response and distortion, measured at 1 meter with a 10 W input.

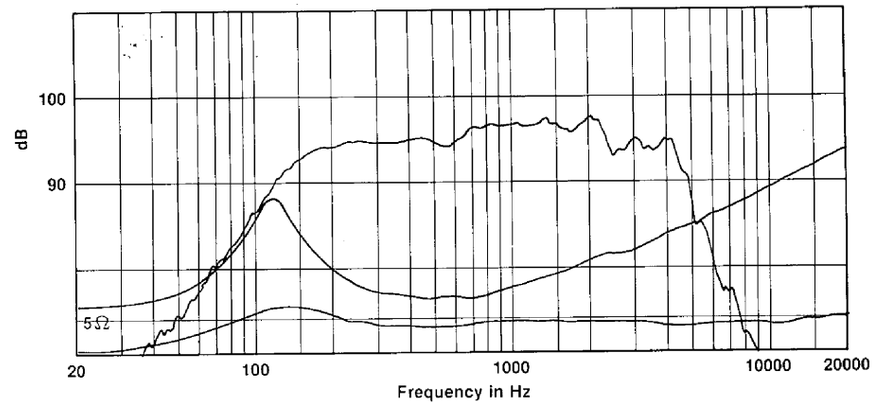
Frequency responses of the individual drivers of the L250. Impedance curves are shown for each driver with and without the conjugate circuits in the network.



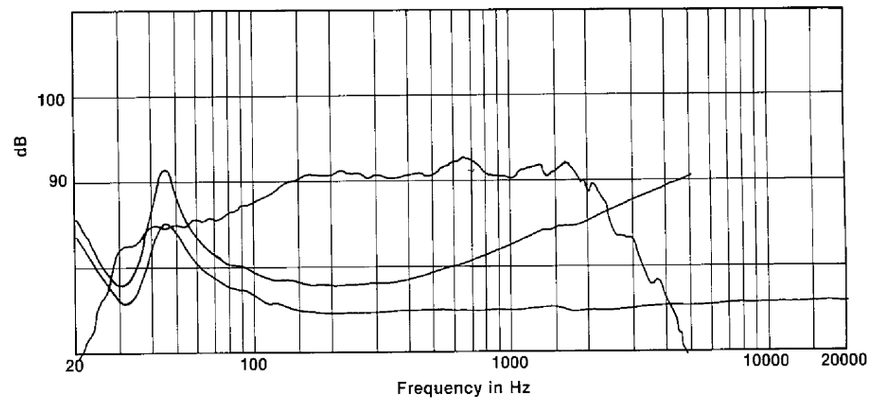
044-1 High Frequency Dome Radiator



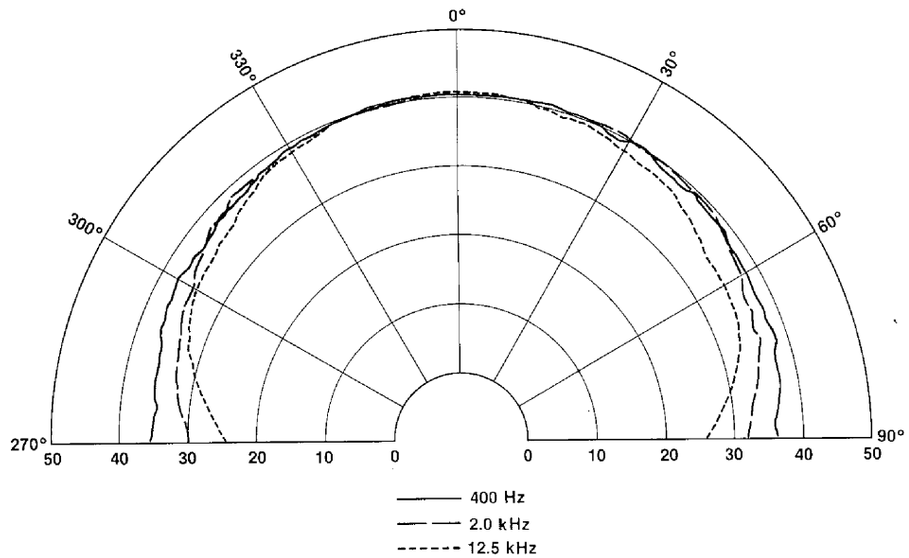
LF5.11 Midrange Loudspeaker



108H Lower Midrange Loudspeaker



LE14H-1 Low Frequency Loudspeaker



Polar response of the L250 at 400 Hz, 2 kHz, and 12.5 kHz, measured in the horizontal plane with ⅓ octave bandwidth pink noise. The close correlation of the curves at the three frequencies is indicative of the smooth power response of the L250.

System	
Maximum Recommended Amplifier Power	400 watts per channel
Nominal Impedance	8 ohms
Crossover Frequencies	400 Hz; 1.5 kHz; 5 kHz
System Sensitivity	90 dB SPL, 1 W, 1 m (3.3 ft)
Low Frequency Loudspeaker	
Nominal Diameter	14 in (360 mm)
Voice Coil	4 in (100 mm) edgewound copper
Voice Coil Depth	19 mm (¾ in)
Magnetic Assembly Weight	18⅝ lb (8.5 kg)
Flux Density	1.2 tesla (12,000 gauss)
Sensitivity[1]	91 dB SPL, 1 W, 1 m (3.3 ft)
Lower Midrange Loudspeaker	
Nominal Diameter	8 in (200 mm)
Voice Coil	2 in (50 mm) copper
Magnetic Assembly Weight	6 lb (2.7 kg)
Flux Density	1.05 tesla (10,500 gauss)
Sensitivity[2]	95 dB SPL, 1 W, 1 m (3.3 ft)
Midrange Loudspeaker	
Nominal Diameter	5 in (130 mm)
Voice Coil	⅞ in (22 mm) edgewound copper
Magnetic Assembly Weight	1⅝ lb (0.74 kg)
Flux Density	1.35 tesla (13,500 gauss)
Sensitivity[3]	94 dB SPL, 1 W, 1 m (3.3 ft)
High Frequency Dome Radiator	
Nominal Diameter	1 in (25 mm)
Voice Coil	1 in (25 mm) copper
Magnetic Assembly Weight	2 lb (0.9 kg)
Flux Density	1.4 tesla (14,000 gauss)
Sensitivity[4]	89 dB SPL, 1 W, 1 m (3.3 ft)
General	
Dimensions	52 in × 22½ in × 14¼ in deep 1321 mm × 572 mm × 362 mm deep
Net Weight	135 lb (61.4 kg)
Shipping Weight	150 lb (68 kg)

1. Averaged from 100 Hz to 500 Hz, within 1 dB.
2. Averaged from 500 Hz to 2 kHz, within 1 dB.
3. Averaged from 800 Hz to 4 kHz, within 1 dB.
4. Averaged above 5 kHz, within 1 dB.

JBL continually engages in research related to product improvement. New materials, production methods, and design refinements are introduced into existing products without notice as a routine expression of that philosophy. For this reason, any current JBL product may differ in some respect from its published description but will always equal or exceed the original design specifications unless otherwise stated.